

Claims:

1. A porous starch-based pigment or filler product, c h a r a c t e r i z e d in that it comprises a stable foam, which contains foam bubbles, the average size of which is less
5 than approximately 10 micrometres.
2. A method of manufacturing a product according to Claim 1, c h a r a c t e r i z e d in that
 - a) air, or other gases, at a low temperature, possibly at overpressure, is dissolved
10 into a water gel of starch, after which the raising of the temperature generates a gas/liquid phase separation, i.e. bubbles are formed, and the product is crosslinked to achieve a stable foam, or
 - b) air is mixed into the starch gel to foam the gel and the foamed gel is cooled rapidly to stabilize the foam, or
 - 15 c) a micro bubble emulsion is formed of the aqueous solutions of the starches and the organic solvents under thorough mixing and in the presence of surface-active agents and crosslinking reagents, or
 - d) a solid starch derivative is contacted with high-pressure carbon dioxide in conditions where the high-pressure carbon dioxide penetrates into the starch
20 derivative, which swells because of the effect of the carbon dioxide, after which the pressure on the starch derivative, which was swelled in the carbon dioxide, is lowered rapidly thereby producing a porous material following decompression.
- 25 3. A method according to Claim 2, c h a r a c t e r i z e d in that in alternative c above, the starch derivative is dissolved into water to a solution, the percentage of which is approximately 1-30 % by weight, preferably approximately 5-20 % per weight, most suitably approximately 10-15 % per weight.
- 30 4. A method according to Claim 3, c h a r a c t e r i z e d in that, in order to increase the stability, 0.01-10 % per weight, preferably approximately 0.1-5 % per weight of a

crosslinking agent, such as glyoxal, is added into the starch-bearing solution.

5. A method according to Claim 2, c h a r a c t e r i z e d in that in alternative d, a solid starch ester or starch ether, with a degree of substitution in the range of 0.5-3.0 mol/mol, preferably at least 1.0, is contacted with a material which comprises mainly carbon dioxide at an elevated pressure and temperature, after which the pressure of the material which was contacting the cellulose ester or cellulose ether and which comprises mainly carbon dioxide is reduced rapidly so that a microporous starch ester or starch ether is achieved after the reduction of the pressure.
6. A method according to Claim 5, c h a r a c t e r i z e d in that a starch ester or a starch ether is contacted with a material which comprises mainly carbon dioxide at a pressure of 100-310 bar and at a temperature of 50-100 ° C.
7. A method according to Claim 5 or 6, c h a r a c t e r i z e d in that a starch ester or a starch ether is contacted with carbon dioxide to which small molecular alcohol or ester has been added.
8. A method according to any of the Claims 5-7, c h a r a c t e r i z e d in that the carbon dioxide comprises 1-15 % per weight small molecular alcohol or ester.
9. A method according to any of the Claims 5-8, c h a r a c t e r i z e d in that the pressure on the material contacting the starch ester or the starch ether and which comprises mainly carbon dioxide is reduced to an essentially lower pressure within 0.08-7 seconds.
10. A product or a method according to any of the preceding claims, c h a r a c t e r i z e d in that the starch-based material comprises starch ether, especially hydroxyalkyl starch, or starch ester, such as starch alkenyl succinate.
11. A product or a method according to Claim 10, c h a r a c t e r i z e d in that in order

to modify the properties of the starch gels/starch foams, an initial material is used which comprises hydroxyalkyl starch or starch alkenyl succinate.

12. Use of a starch-based foam as a pigment and/or filler for paper and cardboard.